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(54) Battery type determination for a radio telephone or battery charger

(57) A battery or battery pack for a portable radio telephone is provided with a machine readable identification on its exterior. An electrical device, such as a portable radio telephone main unit and/or battery charger,

has a battery identifier for reading or sensing the identification. Based upon the identification read by the identifier, the electrical device can prevent or establish an operational electrical connection with the battery cells in the battery.

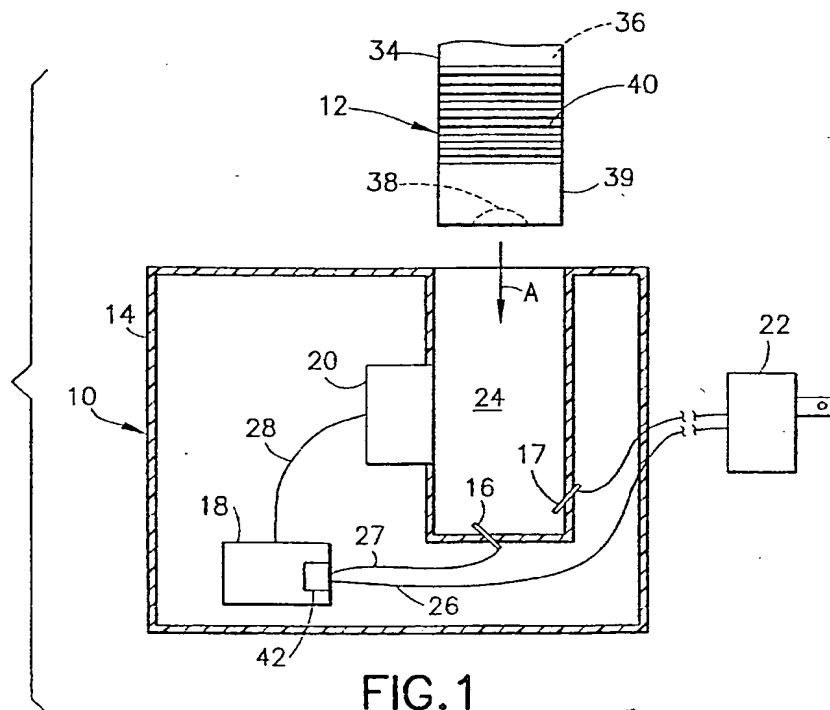


FIG. 1

Fig. 1B is a schematic view of an alternate embodiment of the present invention;

Fig. 1C is a schematic view of another alternate embodiment of the present invention;

Fig. 1 D is a schematic view of another alternate embodiment of the present invention.

Fig. 1 E is a schematic view of another alternate embodiment of the present invention.

Fig. 2A is a perspective view of an alternate type of battery with a machine readable identification of the present invention;

Fig. 2B is a perspective view of another alternate type of battery;

Fig. 2C is a perspective view of the battery shown in Fig. 2A with an alternate type of machine readable identification;

Fig. 2D is a perspective view of the battery shown in Fig. 2B with an alternate type of machine readable identification;

Fig. 2E is a perspective view of a column shaped battery with two types of machine readable identifications;

Fig. 3 is a schematic cross-sectional view of a combined battery charger and telephone holder showing a portable telephone and spare battery in exploded view; and

Fig. 4 is a partial exploded view of a portable telephone main unit and battery incorporating features of the present invention.

[0010] Referring to Fig. 1, there is shown a battery charger 10 and a battery 12 incorporating features of the present invention. Although the present invention will be described with reference to the embodiments shown in the drawings, it should be understood that the present invention can be embodied in many alternate forms of embodiments. In addition, any suitable size, shape or type of elements or materials could be used.

[0011] The battery charger 10 generally comprises a housing 14, battery terminal contacts 16, 17, a controller 18, a battery identifier 20, and a transformer 22. The housing 14 includes a receiving area 24. The receiving area 24 is sized and shaped to receive and hold at least a portion of the battery 12 therein. The battery terminal contacts 16, 17 are spring contacts which are connected to the housing 14 and project into the receiving area 24. One of the contacts 17 is connected directly to the transformer 22. The other contact 16 is connected to the con-

troller 18. The controller 18 preferably comprises a computer or microprocessor. However, in an alternate embodiment the controller 18 could be a simple relay system, such as when the identifier 20 has its own recognition system as further understood below. The controller 18 is connected by power supply lines 26, 27 to the transformer 22 and one of the contacts 16. The controller 18 also has an input by line 28 from the identifier 20. The battery identifier 20 is stationarily connected to the housing 14 at a side of the receiving area 24. Referring also to Fig. 1A, in the embodiment shown the identifier 20 comprises an emitter 30, such as an LED emitter, and a detector 32. The emitter 30 could be powered directly from the transformer 22 or through the controller 18. A battery insertion switch could also trigger the emitter 30 when the battery 12 is inserted into the receiving area 24. In alternate embodiments other types of emitters, detectors or identifiers could be provided. The transformer 22 is a standard type of AC to DC transformer intended to be plugged into an electrical wall outlet.

[0012] The battery 12 is intended to be inserted into the receiving area 24 as indicated by arrow A. The battery 12 is a rechargeable battery. The battery 12 has a frame 34, at least one rechargeable battery cell 36 located inside the frame 34, battery terminals 38, 39, and an identifier section 40. The battery terminals 38, 39 and the contacts 16, 17 are sized, shaped and orientated to contact each other when the battery 12 is inserted into the receiving area 24. The identification section 40 comprises a machine readable identification and, in the embodiment shown, the identification is a bar code. The section 40 is attached to the exterior side of the frame 34. However, in an alternate embodiment the identification could be formed integral with the frame or be located at an internal area of the frame, such as if the frame has a window to view the identification. As noted above, the identification in this embodiment is a bar code. The code of the bar code is selected based upon the type of battery that it is attached to. More specifically, multiple batteries may have the general size and shape to be able to be inserted into the receiving area 24, however, they may be different types of batteries, such as having their battery cells made of different types of materials, such as nickel-cadmium, lead-acid, alkaline, lithium, etc. The code of the bar code is selected by the battery manufacturer or supplier to identify a predetermined characteristics of the battery which the code is attached to, such as the battery cell type. Thus, a first type of battery, such as having a lithium cell, will have a different code than a second type of battery, such as having a nickel-cadmium cell, even though the two batteries might have the same size and shape frame or the same power supply potential.

[0013] As the battery 12 is inserted into the receiving area 24, the identification section 40 passes by the identifier 20. As the identification section 40 passes by the identifier 20, light from the emitter 30 is projected at the section 40 and the bar code is detected or read by the

98 is a semi-conductive strip similar to that described in Fig. 1C. The second identification section 99 is a bar code similar to that described in Figs. 1 and 1A. Thus, the battery 96 can be used with two chargers having different types of battery identification readers or sensors.

[0020] Referring now to Fig. 3, a combined portable telephone holder and battery charger 100 is shown schematically in cross-section with portions of a portable telephone 102 and a spare portable telephone battery 104 in an exploded view. The charger 100 has a frame 106 with two receiving areas 108, 110. The first receiving area 108 is sized and shaped to receive a bottom end of the telephone 102 and stably support the telephone therein. The second receiving area 110 is sized and shaped to receive the bottom end of the spare battery 104 and stably support the battery therein. The charger 100 has a controller 112, two charging terminals 114, 116 and a battery identifier 118. The identifier 118 has access to both receiving areas 108 and 110. The identifier 118 can send separate signals to the controller 112 based upon reading of the identification section 120 of the batteries 103, 104. The controller 112 can then control supply of battery recharging current to the two charging terminals 114, 116 based upon the signals received from the identifier 118. The telephone 102 comprises a main unit 102' with the battery 103 attached thereto. Battery charging current is supplied from the terminal 114, through the main unit 102', to the battery 103. The two batteries 103, 104 are interchangeable with the main unit 102'. In an alternate embodiment, based upon the identification signal sent by the identifier to the controller, the controller could select from at least two different charging modes for different types of batteries. For example, for a lithium battery the identifier would send a first signal to the controller and the controller would allow the charger to charge the lithium battery at a first charging rate or mode. However, for a nickel-cadmium battery, the identifier would send a second signal to the controller, different from the first signal, and the controller would allow the same charger to charge the nickel-cadmium at a second different charging rate or mode. Thus, a single charger, because of the machine readable identification on different types of batteries, can be used to automatically properly charge different types of batteries.

[0021] Referring now to Fig. 4, a partial exploded perspective view of a portable telephone 130 is shown. In this embodiment the telephone 130 has a main unit 132 and a removable rechargeable battery 134. The battery 134 has electrical contacts 136 and a machine readable identification section 138 on its housing 140. However, unlike the batteries shown in Fig. 3 which have their identification sections 120 on the rear side 121 of the batteries, the battery 134 has its identification section 138 on its front side 142; the side that faces the main unit 132 when the battery 134 is attached to the main unit 132. The main unit 132 has electrical contacts 144 for contacting the contacts 136 and a battery identifier

146. The battery identifier 146 is located on the rear side 148 of the main unit 132; the side against which the battery 134 is located. When the battery 134 is mounted to the main unit 132 the identification section 138 is positioned to be read by the battery identifier 146. The identifier 146 can send a signal to a controller inside the main unit 132 based upon that reading or sensing. The controller inside the main unit 132 can then compare the signal to stored signals of acceptable battery identifications. If there is a match or correspondence, the controller will allow the main unit 132 to use power from the battery 134. If there is not a match or correspondence, the controller will prevent the main unit 132 from using power from the battery 134. This can be done by enabling or disabling an electrical connection with the contacts 144. With this type of system having battery identification dependent power supply enablement, the system can prevent an improper battery type from being operably electrically connected with the main unit 132. The present invention could be used with other types of electrical devices other than portable telephones or portable telephone batteries.

[0022] It should be understood that the foregoing description is only illustrative of the invention. Various alternatives and modifications can be devised by those skilled in the art without departing from the invention. Accordingly, the present invention is intended to embrace all such alternatives, modifications and variances which fall within the scope of the appended claims.

[0023] The scope of the present disclosure includes any novel feature or combination of features disclosed therein either explicitly or implicitly or any generalisation thereof irrespective of whether or not it relates to the claimed invention or mitigates any or all of the problems addressed by the present invention. The applicant hereby gives notice that new claims may be formulated to such features during prosecution of this application or of any such further application derived therefrom.

Claims

1. A portable electronic apparatus battery comprising:

a frame;

at least one rechargeable battery cell located inside the frame; and

means for identifying a predetermined characteristic of the battery by an apparatus which the battery is intended to be operably used with, the identifying means including a machine readable identification code.

2. A battery as in Claim 1 wherein the identifying means comprises an indicator of a battery cell type of the rechargeable battery cell and is located on an

wherein the combined telephone holder and battery recharger has a second battery identifier.

18. A method as in Claim 17 wherein the second battery identifier reads the machine readable identification which is located on the exterior of the battery device when the complete telephone is connected to the combined telephone holder and battery recharger. 5

19. A method as in Claim 17 or 18 wherein circuitry in the complete telephone transmits a signal to the combined telephone holder and battery recharger corresponding to the battery device machine readable identifier. 10

20. A method as in anyone of Claims 15 to 19 wherein the electrical device is a battery recharger and the step of connecting connects the battery terminals of the battery device to electrical contacts of the battery recharger. 15 20

21. A method as in anyone of Claims 15 to 20 further comprising preventing operable electrical connection of the electrical device to battery cells in the battery device unless the machine readable identification corresponds to the acceptable battery identification. 25

22. A method as in anyone of Claims 15 to 21 wherein the electrical device has at least two acceptable battery identifications. 30

23. A method as in Claim 22 wherein the electrical device is adapted to switch between at least two different active modes of operation based upon which of the acceptable battery identifications are read by the battery identifier. 35

24. A method of preventing improper use of a portable radio telephone rechargeable battery with an electrical device, the method comprising steps of: 40

providing the battery with an identification;

providing the electrical device with means for sensing the identification; 45

connecting the battery to the electrical device, the sensing means thereby sensing the identification; and 50

the electrical device establishing an operable electrical connection with the battery only if the battery and electrical device are operationally configured and intended to be used with each other based upon the sensed identification and an acceptable identification recognizable by the electrical device. 55

25. A method of manufacturing portable radio telephones comprising:

providing at least two different types of radio telephone batteries, the two different types of batteries having different types of rechargeable battery cells, the two different types of batteries each having a housing with a connection section which have similar sizes and shapes;

connecting two different machine readable identifiers to exteriors of the two different types of batteries, respectively; and

connecting one of the batteries to a first portable radio telephone main unit and the other battery to a second portable radio telephone main unit.

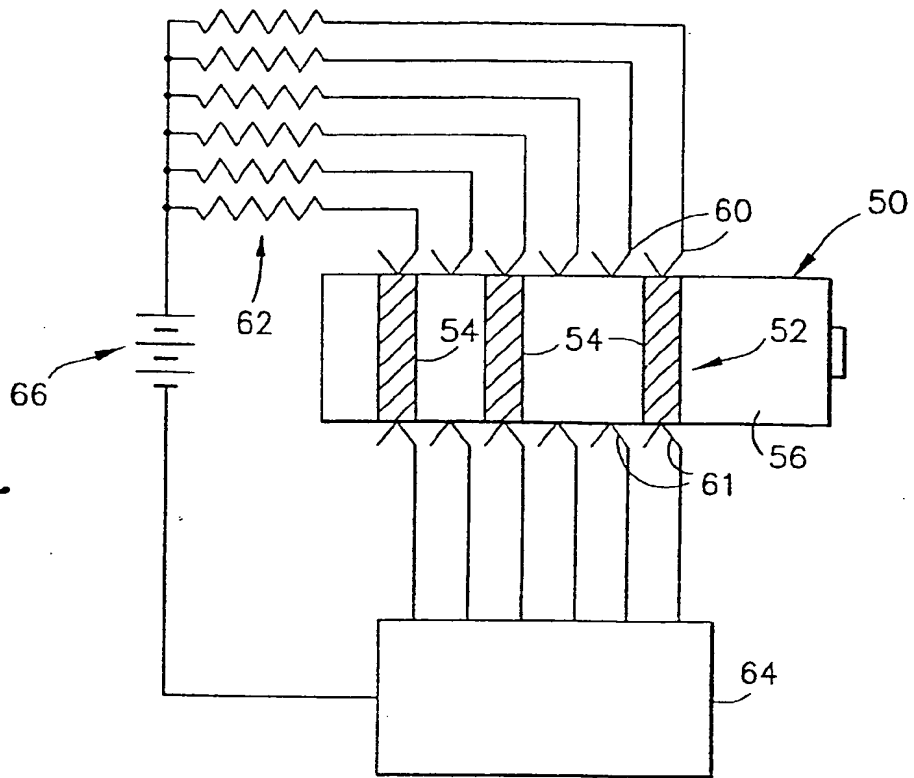


FIG. 1B

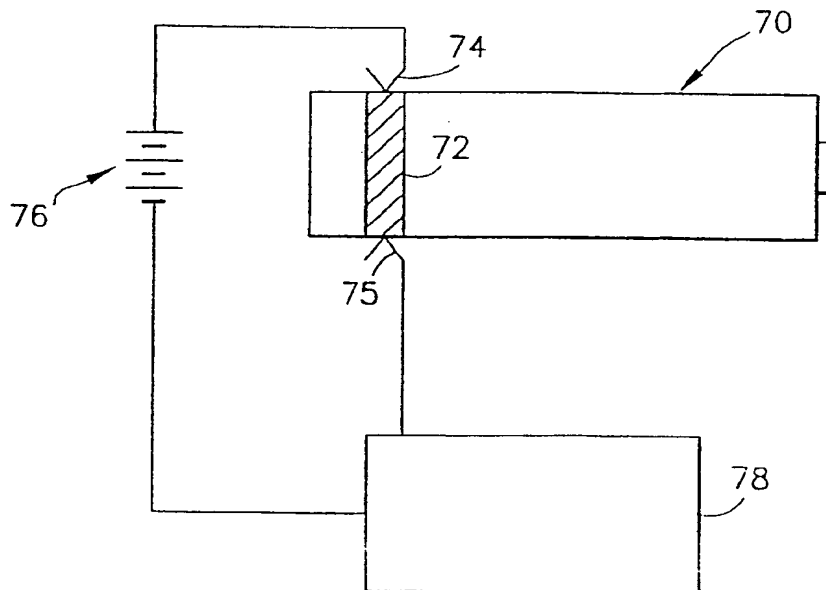


FIG. 1C

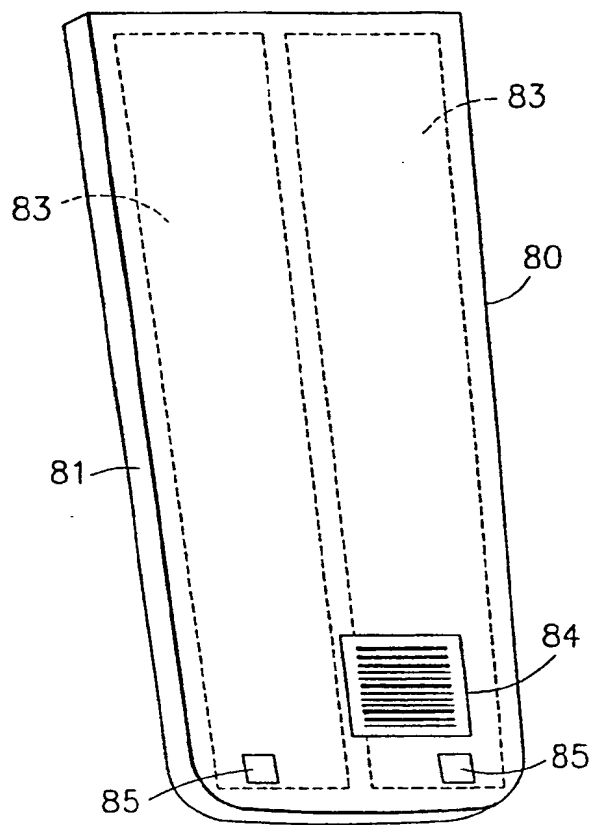


FIG. 2A

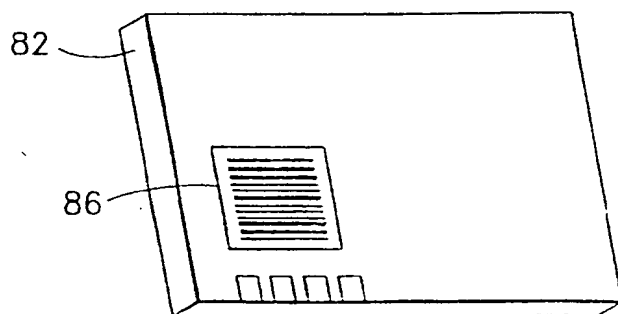


FIG. 2B

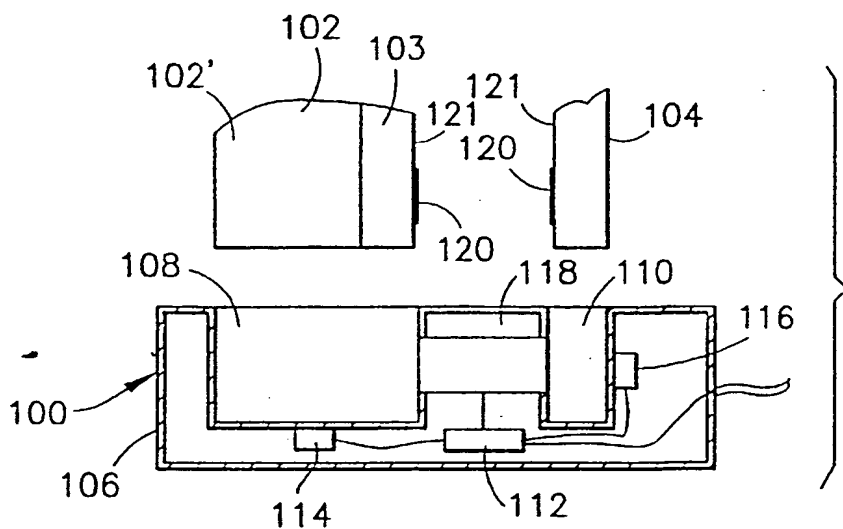


FIG. 3

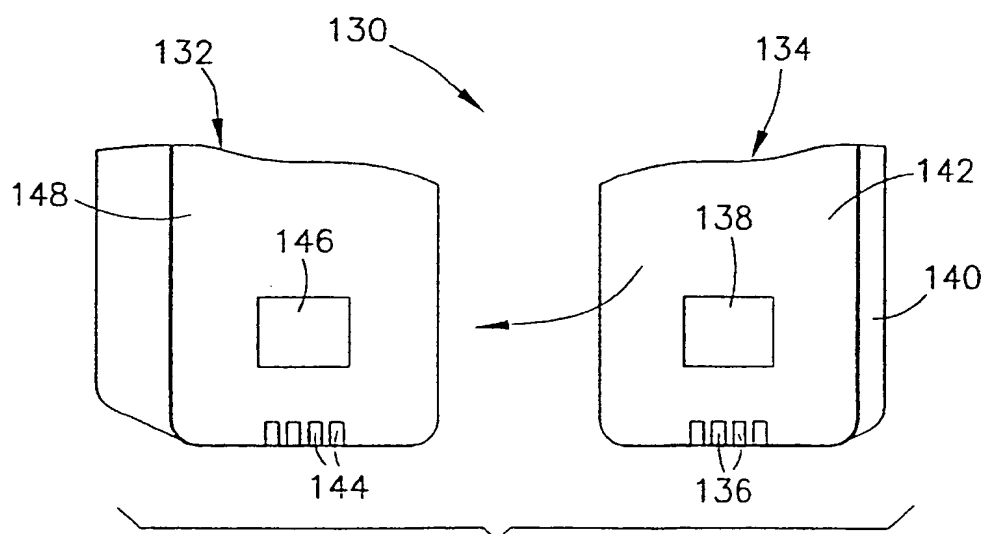


FIG. 4



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EUROPEAN SEARCH REPORT

Application Number
EP 98 30 9895

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	EP 0 693 813 A (YANG ET AL) 24 January 1996 * column 3, line 47 - column 6, line 34; figures 1-6 *	1-5,9, 11,15, 20-22	
A	US 5 274 319 A (KEENER ET AL) 28 December 1993 * column 5, line 11 - column 8, line 9; figures 1-5C *	1-10, 12-15,24	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 8 April 1999	Examiner Calarasanu, P
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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